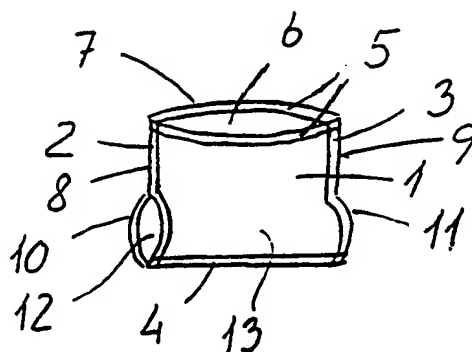


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/DK91/00171</p> <p>(22) International Filing Date: 21 June 1991 (21.06.91)</p> <p>(30) Priority data: 1510/90 21 June 1990 (21.06.90) DK</p> <p>(71) Applicant (for all designated States except US): TYTEX A/S, 7430 IKAST [DK/DK]; Industrivej 21, DK-7430 Ikast (DK).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only) : THYGESEN, Eskild, Georg [DK/DK]; Broholmvej 14, Tulstrup, DK-7430 Ikast (DK).</p> <p>(74) Agent: LEHMANN &amp; REE; Grundtvigsvej 37, DK-1864 Frederiksberg C (DK).</p>		<p>(81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), HU, IT (European patent), JP, LU (European patent), NL (European patent), NO, RO, SE (European patent), SU, US.</p> <p><b>Published</b> With international search report.</p>

(54) Title: PANTY BRIEF FOR FIXATION OF A NAPKIN AND A METHOD OF MAKING SUCH PANTY BRIEFS



## (57) Abstract

An elastic panty brief for fixation of a napkin is made by flat knitting and is formed as a flat rectangular bag. The bagsides (1) provide a front piece and a back piece which are mutually connected along the marginal edge zones (2, 3 and 4) in the sides and bottom of the bag and which are non-connected along the marginal edge zone (5) at the top of the bag as the marginal edge zone (5) provides a waist-band (7) surrounding a waist-band opening (6). To make such a panty brief having a sufficient space for holding the napkin product, i.e. with a large crotch region between the leg openings (12) of the panty brief, the front piece and the back piece are connected only along an upper part (8, 9) of the marginal edge zones (2, 3) in the sides of the bag. Thus, leg openings (12) are provided opposite each other at a lower non-connected part (10, 11) of the marginal edge zones (2, 3) in the sides of the bag. Hereby the crotch region (13) between the two leg openings (12) is very wide so that a napkin product in a secure way is obtained therein.

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PANTY BRIEF FOR FIXATION OF A NAPKIN AND A METHOD OF MAKING SUCH PANTY BRIEFS.

Background of the Invention.

5 The present invention relates to an elastic panty brief for fixation of a napkin made by flat knitting and formed as a flat rectangular bag, the bagsides of which provide a front piece and a back piece, which are mutually connected along the marginal edge zones in the sides and the bottom of the bag and which are non-connected at the top of the bag as the marginal edge zones here provide a waist-band.

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It is known to knit panty briefs in endless lengths with waist opening and leg openings in one and the same operation without requiring any after-fashioning in the form of cutting, edging, seaming, etc. When these panty briefs are to be used for fixation of napkins it is known to vary the sizes of the meshes in larger or smaller portions in such a way that a looser portion is produced for containing the napkin product.

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A panty brief of the type described above is known e.g. from US patent No. 3,656,324. The present invention is regarded as a further development which makes it possible to make a panty brief which is particularly suitable for fixation of a napkin.

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A substantial drawback associated with the known panty briefs is that the crotch region between the leg openings is very small. In the known panty briefs the leg openings are placed end to end along the marginal edge zone at one longitudinal edge. The connection between the front piece and the back piece which is placed between the leg openings presses against the napkin and the very limited width of the crotch region increases the risk of leakage from the outer edges of the napkin.

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It is the object of the invention to remedy the above mentioned drawbacks with flat knitted panty briefs and to provide a panty brief where the crotch region between the two openings has a large width which allows a napkin to be contained effectively therein, said panty brief being made ready for use without any after-fashioning.

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According to the present invention, this object is achieved in that

the front piece and the back piece are connected only along an upper part of the marginal edge zones at the sides of the bag, that leg openings are provided between the front piece and the back piece at the non-connected lower part of the marginal edge zones at the sides of the bag, which leg openings are placed opposite each other, and that the crotch region between the two leg openings has a width substantially corresponding to the width of the front piece and the back piece. Thus, in a surprisingly simple manner it becomes possible to make a panty brief for fixation of a napkin having a very wide crotch region and due to the elasticity the panty brief will adapt itself to the user and be comfortable to wear. Due to the very wide crotch region even very large napkin products, e.g. used by adults suffering from incontinence, will be secured effectively in the crotch region of the panty brief without risk of leakage along the edges. This is due to the fact that the very wide crotch region provides a substantially banana-shaped bulge in which the centre of the napkin product is pressed downwards and outwards while the edges of the napkin are held upwards and in contact with the body.

The present invention also relates to a method of making an elastic panty brief for fixation of a napkin made by flat knitting and formed as a flat rectangular bag, the bagsides of which provide a front piece and a back piece, which are mutually connected along the marginal edge zones in the sides and the bottom of the bag and which are non-connected at the top of the bag as these marginal edge zones provide a waist-band, said panty briefs being made in endless lengths of superposed webs in which severing zones are provided at intervals in connections transversely to the webs to form a continuous series of bag-formed preparatory products.

This method is characterized in that the transversely extended connections between the superposed webs are made by interknitting the web across only a part of the width extending from the non-connected marginal edge zones, and that the leg openings thus are provided across the remaining width in the transverse direction of the webs. By this method panty briefs are advantageously made in endless lengths, and no after-fashioning is required as the panty briefs are ready to use after cutting the webs in the transverse direction.

As mentioned above the present invention can be considered a further development of a panty brief as disclosed in US Patent No. 3,656,324, and as mentioned in the US Patent materials, knitting types, sizes etc. also apply to the production of the panty brief according to the present invention.

Description of the Drawings.

The invention will now be further explained with reference to the accompanying drawing, wherein

- 10 Figs. 1-4 are diagrammatic embodiments of a panty brief according to the invention, seen as produced in a flat state,
- Fig. 5 is a diagrammatic representation of the panty brief shown in Fig. 1 illustrating its configuration on a user,
- 15 Fig. 6 is a diagrammatic representation of a further embodiment of a panty brief according to the invention seen as produced in a flat state,
- Fig. 7 is a diagrammatic representation illustrating a method according to the invention,
- 20 Fig. 8 is a fragmentary representation of a knitting pattern illustrating how the leg openings are made, and
- Fig. 9 is a fragmentary representation of a knitting pattern illustrating how the leg waist-band means are made by interknitting elastic threads transverse to the direction of knitting.
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Fig. 1 shows a panty brief for fixation of a napkin according to the invention and produced by flat knitting on a Raschel knitting machine. The panty brief is formed as a flat substantially rectangular bag, the bagsides 1 of which provide a front piece and a back piece. The front piece and the back piece may be made identical, but, the back piece may also be made with a looser knitting to achieve a better fitting to the body in the finished panty brief. The bagsides are connected along marginal edge zones 2,3 and 4 in the sides and bottom of the bag. At the top of the bag the marginal edge zones 5 of the bagsides 1 are non-connected, as a waist-band opening 6 is provided therein. The marginal edge zones 5 are produced in a way known per se so as to form a waist-band 7 around the waist-band opening 6. At the bottom the bagsides are connected along the entire marginal edge zone 4. In the sides

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the connection along the marginal edge zone extends only over the upper part 8,9 of the marginal edge zones in the bagsides. The bagsides are non-connected at the lower part 10,11 of the marginal edge zones in the sides, thereby providing leg openings 12 which are located opposite each other. Thus, a very wide crotch region 13 is provided between the two leg openings 12. The very wide crotch region is extremely suitable for effectively securing and holding the napkin. As the crotch region 13 has a very large width the central part of the napkin will have a tendency to be pressed downwards and outwards while the marginal edge zone of the napkin will be held upwards and in contact with the body. As a result the risk of leakage at the marginal edge zone of the napkin product is reduced. The configuration of the panty brief for fixation of a napkin in use is illustrated in Fig. 5.

In the marginal edge zones 2,3 at the sides of the bag the panty brief is provided with a severing zone extending across both the upper and the lower parts 8,9;10,11 of the marginal edge zones in the bagsides. Consequently, no after-fashioning is necessary as the severing zone at the lower parts of the marginal edge zones constitutes a waist-band-forming marginal edge zone for each of the leg openings 12. Thus, when the panty briefs are advantageously made in endless lengths of webs they are ready for use after a cutting in the transverse direction of these webs.

Fig. 2 illustrates a further embodiment where the panty brief for fixation of a napkin is provided with interknitted elastic threads 14 extending obliquely upwards and outwards from the central part of the panty brief. The elastic threads 14 are placed in such a way that in use they effect the marginal edge zone of the napkin product, thus resulting in an improved safety against leakage from the napkin product.

In Fig. 3 a further embodiment is illustrated where the panty brief for fixation of a napkin is provided with a pocket-forming fixation part in form of threads 15 which are non-interknitted with the remaining part of the web across a part of the front piece and/or the back piece. The panty brief is illustrated in the form in which it appears after it has been made and separated from adjacent panty briefs. When the panty brief is to be used the inside is turned out so that the

treads 15 are located inside the panty brief and are ready to receive the napkin product.

5 In Fig. 4 an embodiment is illustrated where the means for fixation of a napkin consist of a zone 16 having a looser knitting. Such a zone 16 having a looser knitting can be contained both in the front piece and the back piece or in one of these only.

10 Fig. 6 illustrates a further embodiment in which the panty brief for fixation of a napkin is provided with leg-band means 27 at the leg openings 12. The leg-band means 27 are made by knitting elastic threads 28 transverse to the direction of knitting 30 in a zone 29 located adjacent to each of the leg openings 12 (see Fig. 9). In a central zone 31 the panty brief can be made with any suitable structure. It is noted that Fig. 9 only illustrates the principle in making the leg-band openings 27 and that the number of elastic threads 28 may be varied. It is also possible to vary the length of the zones 29 to provide smaller or wider leg-band means 27. By means of the transverse interknitting of the elastic threads 28 a panty brief having extremely elastic leg openings is obtained, the edge zones of which (leg-band means 27) abut on the leg of the user. This increases the fit advantageously and the ability of the panty brief to hold the edge zones on a napkin placed in the panty brief. Hereby a good security against leakage from the napkin is obtained as a tighter and firmer fit to the user is obtained when the panty brief is placed on the wearer.

30 In Fig. 7 a method of making the panty brief for fixation of a napkin shown in Fig. 1 is illustrated. The panty briefs are made by two flat knitted superposed webs 17,18. The webs are connected along marginal edge zones 19 placed opposite each other in the longitudinal direction of the webs while the other marginal edge zone 20 of each of the webs is made by a knitting providing a waist-band 7. The webs are connected (at 21) in the transverse direction in such a way that a continuous series of bag-formed preparatory products 22 are provided. In the zones 21 of the transverse connections the webs are provided with severing zones 23 extending in the full width of the webs. The connections in the transverse direction of the webs only extend across the upper part 24 of the zones 21 extending from the non-connected marginal edge zones 20. The marginal edge zones 19 are connected (at 25) in the en-

5      tire longitudinal direction of the webs. After cutting along the severing zones 23 a panty brief is thus produced, as the leg openings 12 are placed opposite each other in each of the sides of the panty brief in a lower part 26 of the zones 21 in which the front piece and the back piece are non-connected in the transverse direction. Thus, the illustrated method provides a panty brief which, if desired after a turning, is ready for use after cutting along the severing zones in the transverse direction of the webs.

10      Thus, by means of a conventional Raschel machine the method makes it possible to make a ready for use panty brief for fixation of a napkin having a very wide crotch region and which effectively can contain a napkin product in such a way that no leakage occurs along the outer edge thereof.

15      In Fig. 8 a fragmentary of a knitting pattern is shown illustrating that the severing zone 23 extends across the whole width of the panty brief and that the severing zone is interknitted in the upper part 24 in the sides, while in the lower part 26 no interknitting is made in order to provide the leg openings. From this knitting pattern a marginal edge zone providing a waist-band 7 is also seen.

20      In Fig. 9 a fragmentary of a knitting pattern is shown illustrating how the elastic threads 28 are interknitted in the immediate vicinity of the leg openings. These threads 28 provide a shirring effect at the leg openings of the panty brief in such a way that an improved security against leakage from the napkin product is obtained.

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C L A I M S.

1. An elastic panty brief for fixation of a napkin made by flat knitting and formed as a flat rectangular bag, the bagsides (1) of which provide a front piece and a back piece, which are mutually connected along the marginal edge zones (2,3 and 4) in the sides and the bottom of the bag and which are non-connected at the top of the bag as the marginal edge zones (5) here provide a waist-band (7), characterized in that the front piece and the back piece are connected only along an upper part (8,9;24) of the marginal edge zones (2,3) at the sides of the bag, that leg openings (12) are provided between the front piece and the back piece at the non-connected lower part (10,-11;26) of the marginal edge zones (2,3) at the sides of the bag, which leg openings are placed opposite each other and, that the crotch region (13) between the two leg openings has a width substantially corresponding to the width of the front piece and the back piece.
2. A panty brief for fixation of a napkin according to claim 1, characterized in that each of the marginal edge zones of the front piece and the back piece are provided with a severing zone (23) in such a way that neither the connected part (8,9;24) nor the non-connected part (10,11;26) of the marginal edge zones at the leg openings require any after-fashioning.
3. A panty brief for fixation of a napkin according to claims 1 or 2, characterized in that the front piece and/or the back piece near the bottom is made with symmetrically placed integral means for fixation of a napkin in order to effectively secure a napkin.
4. A panty brief for fixation of a napkin according to claim 3, characterized in that the means for fixation of a napkin are provided by a looser knitting (16) and/or interknitted elastic threads (14), known per se, extending obliquely upwards and outwards from the central part of the panty brief in order to effect the marginal edge zone of the napkin in use, or that the means for fixation of a napkin are provided by a pocket-forming holding part (15) made integrally with the remaining part of the web which the pocket-forming holding part is attached to.

5. A panty brief for fixation of a napkin according to claims 1 or 2, characterized in that the front piece and/or the back piece near the leg openings are made with integral leg-band means (27) for producing an elastic shirring effect of the marginal edge zone which delimits the leg openings.

6. A panty brief for fixation of a napkin according to claim 5, characterized in that the leg-band means (27) are provided by a zone (29) close to the leg openings (12) where elastic threads (28) are interknitted transversely to the panty brief close to the lowest part (10,11) of the marginal edge zones.

7. A method of making an elastic panty brief for fixation of a napkin made by flat knitting and formed as a flat rectangular bag, the bag-sides of which form a front piece and a back piece, which are mutually connected along the marginal edge zones in the sides and the bottom of the bag and which are non-connected at the top of the bag as these marginal edge zones (20) provide a waist-band (7), which panty briefs are made in endless lengths of superposed webs (17,18) where severing zones (23) are provided at intervals at connections (21) in the transverse direction of the webs to form a continuous series of bag-formed preparatory products (22), characterized in that the transversely extended connections (21) between the superposed webs are made by interknitting the web across only a part (24) of the width extending from the non-connected marginal edge zones (20), and that the leg openings (12) are formed across the remaining width (26) in the transverse direction of the webs.

8. A method according to claim 7, characterized in that the panty brief is provided with means for fixation of a napkin which are placed symmetrically in the panty brief ready for use and are made integrally with at least one of the webs.

9. A method according to claim 8, characterized in that the means for fixation of a napkin are provided by a looser knitting (16) and/or by interknitting elastic threads (14) extending obliquely upwards and outwards from the central part of the front piece and the back piece and which are provided in order to effect the marginal edge zone of the napkin product or that the means for fixation of a napkin

are provided as a pocket-forming holding part (15).

10. A method according to claim 7, characterized in that  
the panty brief is made with leg-band means (27) surrounding the leg  
openings in the panty brief ready to use and which are made integrally  
with the front piece and/or the back piece.

11. A method according to claim 10, characterized in that  
the leg-band means are provided by knitting an area (29) close to the  
leg openings (12) in which area elastic threads (28) are interknitted  
transversely to the direction of knitting (30) close to the lowest  
part (10,11) of the marginal edge zones.

12. A method according to any of the claims 7-11, characterized  
in that different zones of the panty brief are made with a  
firmer and looser knitting in order to achieve a fitting to the body  
in the finished panty brief.

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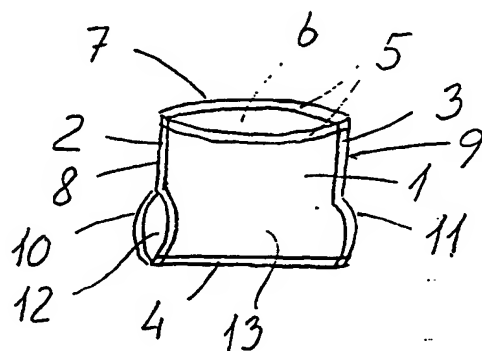


FIG. 1

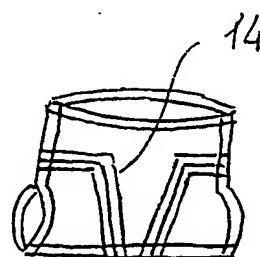


FIG. 2

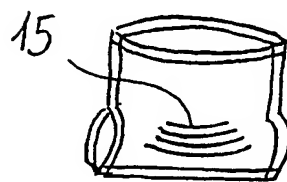


FIG. 3

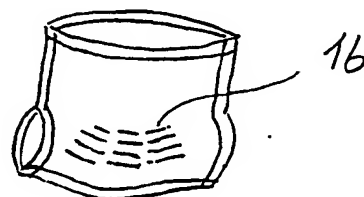


FIG. 4

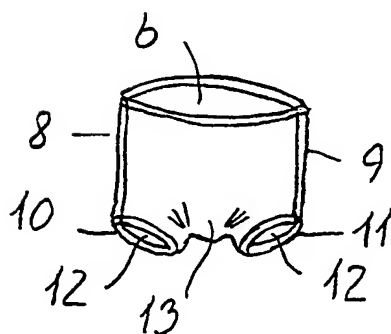


FIG. 5

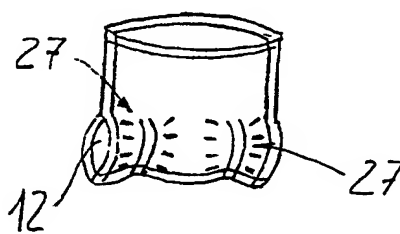


FIG. 6

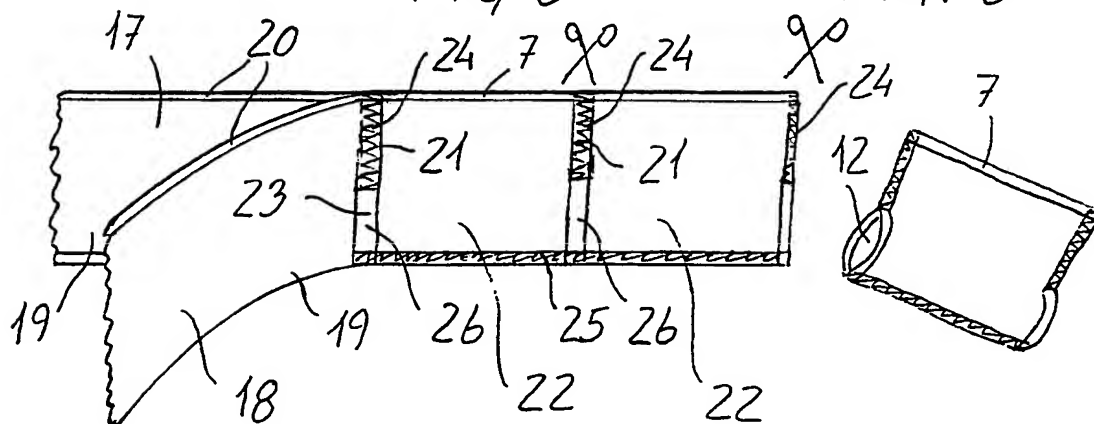
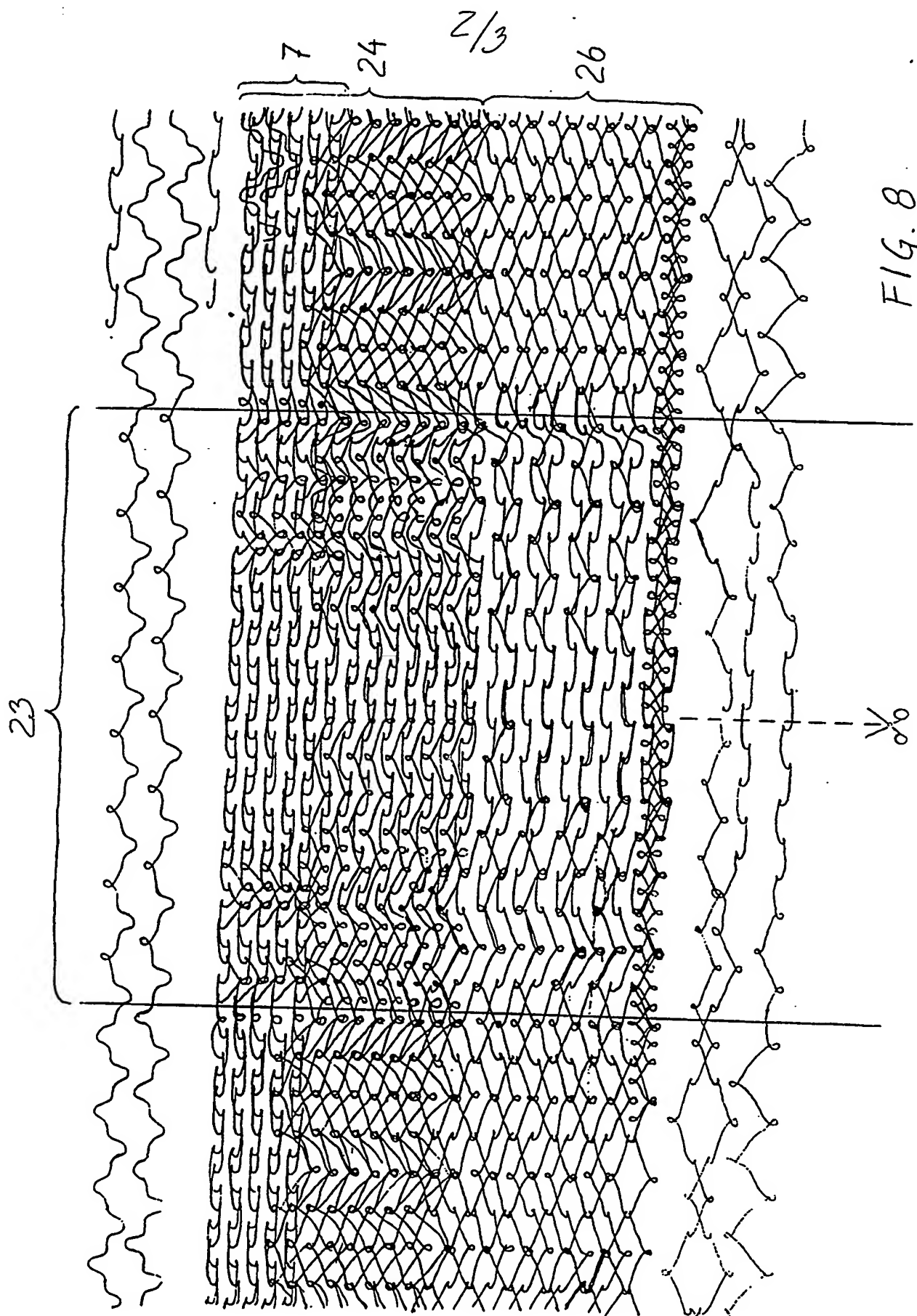


FIG. 7



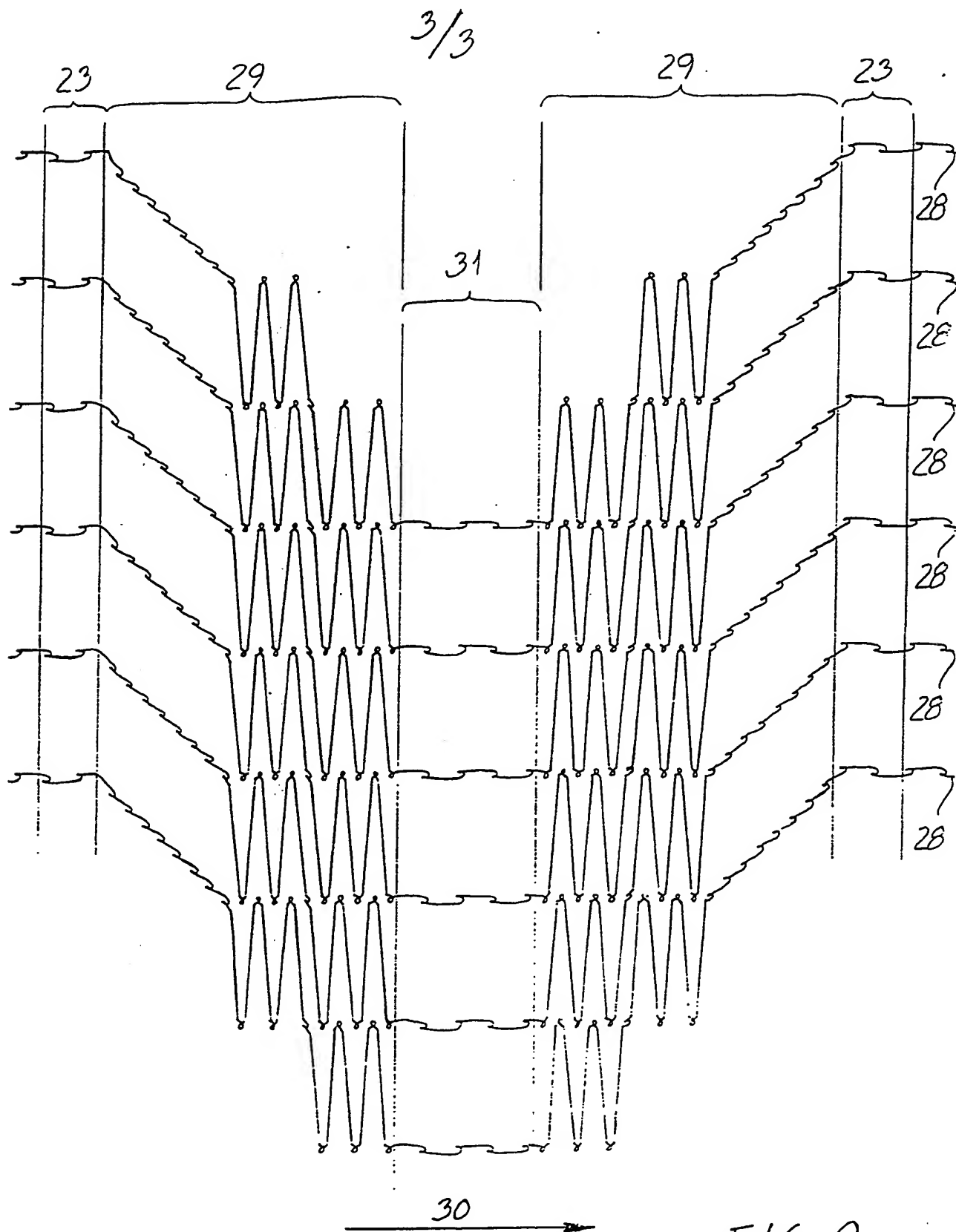


FIG. 9

# INTERNATIONAL SEARCH REPORT

International Application No **PCT/DK 91/00171**

**I. CLASSIFICATION OF SUBJECT MATTER** (if several classification symbols apply, indicate all)<sup>6</sup>  
According to International Patent Classification (IPC) or to both National Classification and IPC  
**IPC5: D 04 B 21/20**

**II. FIELDS SEARCHED**

Minimum Documentation Searched <sup>7</sup>	
Classification System	Classification Symbols
IPC5	D 04 B; A 41 B; A 61 F

Documentation Searched other than Minimum Documentation  
to the Extent that such Documents are Included in Fields Searched<sup>8</sup>

**SE,DK,FI,NO** classes as above

<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>		
Category *	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>
A	WO, A1, 8805270 (A/S TYTEX, IKAST) 28 July 1988, see page 1, line 36 - line 40; claims 1,9 ---	1,3,4,7- 9,12
A	EP, A1, 0184770 (A/S TYTEX, IKAST) 18 June 1986, see claims 1,5 ---	1,7, 12
A	SE, B, 365260 (UNION CARBIDE CORPORATION) 18 March 1974, see page 2, line 6 - line 16; page 6, line 3 - line 8 ---	1,2,7
A	SE, B, 444824 (MÜLLER ELASTICS GMBH & CO KG) 12 May 1986, see claim 1 ---	1,7

**\* Special categories of cited documents:<sup>10</sup>**

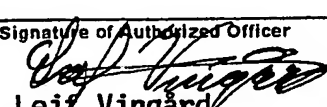
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"Y" document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

<b>IV. CERTIFICATION</b>	
Date of the Actual Completion of the International Search <b>19th September 1991</b>	Date of Mailing of this International Search Report <b>1991 -09- 24</b>
International Searching Authority  <b>SWEDISH PATENT OFFICE</b>	Signature of Authorized Officer  <b>Leif Vingård</b>

## III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No
A	US, A, 3098484 (J.M. YOUNGER) 23 July 1963, see claim 2 -- -----	5,6,10, 11



**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO. PCT/DK 91/00171**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the Swedish Patent Office EDP file on **91-08-30**.  
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US-A- 3098484	63-07-23	NONE	